

ARI Technical Report 1173

**Understanding, Predicting, and Supporting Leader
Self-Development**

Lisa A. Boyce

George Mason University
Consortium Research Fellows Program

Michelle M. Wisecarver

U.S. Army Research Institute

Stephen J. Zaccaro

George Mason University

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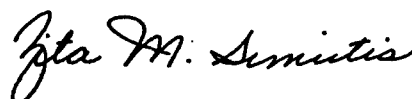
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Sena Garven, U.S. Army Research Institute

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Lisa A. Boyce

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Michelle M. Wisecarver

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Stephen J. Zaccaro

George Mason University

**Leadership Development Research Unit
Stanley M. Halpin, Chief**

**U.S. Army Research Institute for the Behavioral and Social Sciences
2511 Jefferson Davis Highway, Arlington, Virginia 22202-3926**

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UNDERSTANDING, PREDICTING, AND SUPPORTING LEADER SELF-DEVELOPMENT

EXECUTIVE SUMMARY

Research Requirement:

The Department of the Army Pamphlet (DA Pam) 350-58, *Leader Development for America's Army*, describes three development methods that serve as the foundation for developing Army officers: Institutional Training and Education, Operational Assignments, and Self-Development. Self-Development is intended as a method to enhance, sustain, and expand their leadership capabilities. Although self-development holds a central role in Army leader development doctrine, very little is known about who engages in self-development, what types of activities they do, and how organizations can facilitate self-development. Research is needed in a number of areas related to self-development. This research proposed a model to measure an individual's propensity to engage in leader self-development and to predict their actual performance of leader self-development activities. It also examined the effects of organizational support on self-development performance.

Procedure:

Based on a review of the training and development literature we identified an initial set of individual characteristics that were expected to predict leader self-development performance. Using the basic tenet that performance is a function of an individual's motivation and skill, a model was proposed in which motivation and skills mediated the relationships between identified individual attributes and the individual's propensity to self-develop. It was predicted that individuals with higher levels of work orientation, achievement-striving orientation, and mastery orientation would have higher motivation for leader self-development, and that individuals with higher levels of mastery orientation, career-growth orientation, and cognitive ability would have higher levels of the skills required for leader self-development.

In order to investigate the effects of organizational support, a website was created for this research on the topic of Leader Self-Development that served as an organizational support tool. We predicted that an organizational level support tool such as the website could increase the likelihood that an individual would engage in self-development activities, although not for those with extremely low or high propensity to self-develop.

Data were collected from 498 officers attending the Combined Arms Services Staff School. Two surveys were collected during the course in June 2002 to measure individual characteristics and propensity to self-develop. Following the administration of the surveys, half of the students were informed about and provided access to the website, while half were not, simulating a situation in which only half were provided with organizational support. Follow up data regarding the officers' performance of self-development activities was then collected four months later via electronic mail.

Findings:

Survey data from the officers at the end of the four months found that while nearly 50% reported performing leader self-development activities for 20 or more hours, 14% indicating they had not spent any time performing leader self-development. The specific leader competency for which officers reported spending the greatest number of hours on self-development was technical/tactical proficiency. While participants indicated that they valued being a more effective leader, they were less inclined to indicate

that successful self-development of leadership skills would lead to actually becoming a more effective leader, and even less likely to believe that they could successfully develop and conduct a personal leadership self-development program. When asked to select the factors that prevented them from performing leader self-development, the most commonly selected responses for all officers were "lack of time," "job responsibilities" and "home/family responsibilities." The types of materials listed as most useful for leader self-development were: (1) Reading (e.g., journals, magazines, books), (2) Internet, and (3) Peers, co-workers, family.

Analysis of the predictors of self-development using structural equations modeling indicated that the data fit the self-development model reasonably well. The model depicted a person with a mastery, work, and career-growth orientation as more motivated to perform leader self-development and more skilled at performing instructional and self-regulatory processes and therefore more likely to perform leader self-development. Results did not support the importance of Achievement-Striving Orientation as a predictor of Motivation or Cognitive Ability as a predictor of Skills.

Results further showed that the existence of organizational support moderated the performance of leader self-development activities. As predicted, individuals with low to moderately low propensity performed self-development to a greater extent when they received the information about organizational support than their counterparts who did not receive organizational support. One unexpected finding was that individuals with high propensity performed more self-development if they were not in the group who received information about the website.

Utilization and Dissemination of Findings:

Results of this research provide a description of the characteristics of leaders who have a propensity to perform leader self-development. This information could be used to develop assessment and training tools that would provide Soldiers and their leaders with individual feedback as well as support for future self-develop efforts. The results also provided empirical evidence for the importance of organizational support for self-development.

Results can be used by proponents of Army leader development, the U.S. Army Training and Doctrine Command, or other Army elements interested in promoting the accomplishment of leader self-development within the Army. Initial results were briefed to the Commandant of the Command and General Staff College in August of 2003.

UNDERSTANDING, PREDICTING, AND SUPPORTING LEADER SELF-DEVELOPMENT

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UNDERSTANDING, PREDICTING, AND SUPPORTING LEADER SELF-DEVELOPMENT

Introduction

Army documents discussing leader development, such as the Department of the Army Pamphlet (DA Pam) 350-58, *Leader Development for America's Army*, describe three development methods that serve as the foundation for developing Army officers: Institutional Training and Education, Operational Assignments, and Self-Development. The expectation is that an officer will develop their primary leadership skills, knowledge, and behaviors during their institutional training, then practice and refine these during operational assignments. Self-development is considered a continuous process that enhances, sustains, and expands capabilities learned from institutional training and operational assignments.

Very little is known in the Army or in the public sector about self-development, or leader self-development, specifically. Given that it is projected as one of three critical pillars of the development of Army leaders, research regarding self development practices in the Army and factors related to engaging in self-development would be useful. From a theoretical perspective our goals in this research were to define a model of personal attributes that predict propensity to participate in leader self-development activities, and to determine whether organizational support is an important factor in determining actual participation in self-development activities. In addition, from an applied standpoint, we were interested in gaining insight into the prevalence of leadership self-development activities among a sample of mid-level Army leaders.

After defining leader self-development, we will identify a model of individual characteristics hypothesized to predict participation in leader self-development activities, and specify the expected effects of organizational support within this model.

Defining Leader Self-Development

Self-development is an approach to training that relies on individuals to take the primary responsibility for identifying, planning, carrying out, and evaluating their own learning experience. Two key elements of this are that the individual controls both *what* to learn (i.e., the objective) and *how* to learn (i.e., the process).

As a general rule, an individual's activities would be considered self-development when each of the following is true: (1) the activities related to learning added up to at least seven hours, (2) "more than half of the person's total motivation is to gain and retain certain fairly clear knowledge and skill, or to produce some other lasting change in himself", and (3) the activities have definite beginning and ending times, and the information is retained for at least two days after the learning episode takes place (Tough, 1971 in Brockett & Hiemstra, 1991, p. 41). Excluded from self-development are activities in which learning was unintended, or was intended but serves only an immediate purpose and is quickly forgotten.

Leader self-development, then, refers to those deliberate activities that an individual undertakes in order to gain and retain knowledge, skills, or abilities specifically in the domain of leadership.

Developing a Model of Leader Self-Development

Despite the potential importance of self-development, little systematic research has examined characteristics associated with individuals who perform self-development or the effect of organizational

support in promoting self-development performance (Candy, 1991; Yukl, 1998). Prior to 2004 (v. Maurer, Weiss, & Barbeite, 2003; Simmering, Noe, Colquitt, & Porter, 2003) research on employee development, while pioneering, was limited in several ways. First, it included few variables focused on demographic predictors; second, it relied on quasi-experimental or cross-sectional designs and self-report data; or third, it used non-managerial samples (e.g., Birdi, Allen, & Warr, 1997; Kozlowski & Farr, 1988; London, Larsen, & Thisted, 1999; Maurer & Tarulli, 1994; Noe & Wilk, 1993; Tharenou, 1997).

As a result, leaders in organizations still have little to no information regarding which employees would be likely to engage in self-learning activities or how their organization could facilitate employee participation in professional or job-related self-development such as leadership self-development.

In order to develop a model that would predict propensity to participate in leadership self-development activities, we started with the basic performance determinants tenet that performance in any setting is a function of an individual's motivation and skill (Campbell, 1990; Campbell, McCloy, Oppler, & Sager, 1993). Motivation and skills, therefore, were considered proximal indicators of propensity to perform self-development, and provided a structure to understand why certain individuals have a greater tendency to perform self-development (see Figure 1). As proximal indicators, these variables were expected to partially mediate the relationship between stable dispositional attributes and the propensity to self-develop.

Given the lack of research in the area of self-development, we reviewed the training and development literature to identify an initial set of motivation and skill predictors. The characteristics initially identified were either empirically or theoretically linked to participation or performance in training (i.e., as opposed to self-development, specifically). Despite the parallels between training and self-development, self-development is unique in that the individual, as opposed to the institution, is ultimately responsible for multiple aspects of the training program. Essentially, the trainee is also the trainer, in that the self-developer assesses their own training needs, plans and develops their training objectives, selects and designs their instructional program, and evaluates their own training progress (Piskurich, 1993). In light of these differences, the initial list of individual characteristics was reviewed conceptually to include only those dispositions most relevant to the self-development situation and the performance determinants model.

Three categories of individual characteristics were identified as likely antecedents for motivation: work orientation, achievement-striving orientation, and mastery orientation. Three categories were also identified as likely antecedents for skills: mastery orientation, career-growth orientation, and cognitive ability. We will first describe motivation and the individual characteristics expected to predict motivation; then describe the skills required for leader self-development and the individual characteristics expected to predict these skills.

Motivation

Cognitive choice theories have remained a popular approach for understanding motivation. One cognitive theory, Expectancy Theory (Vroom, 1964), is particularly applicable to understanding future behaviors. The key elements of this theory are labeled expectancy, instrumentality, and valence. Expectancy refers to an individual's belief about whether he or she can achieve a certain level of performance in an area; in this case, whether he or she can successfully develop and conduct a leader self-development program. Instrumentality refers to the individual's belief regarding whether achieving that performance will accomplish a secondary goal, such as becoming a better leader (post-1964 Vroom; e.g., Kanfer, 1990). In this case, then, it refers to the belief that engaging in leader self-development will result in becoming a more effective leader. Finally, valence refers to the value that an individual places on the

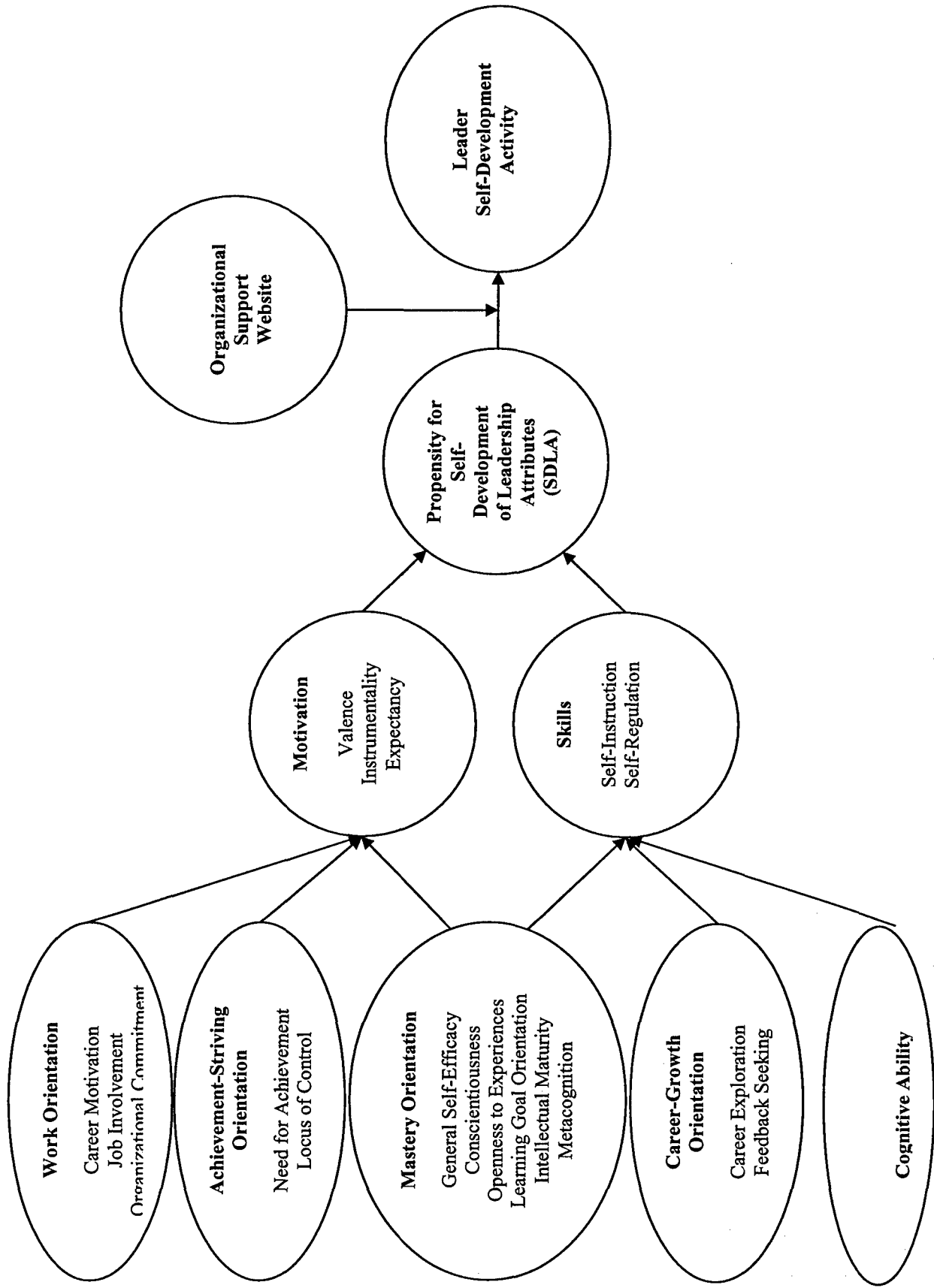


Figure 1. Leader self-development conceptual model.

secondary goal, in this case, the extent to which he or she values being an effective leader. These three elements of Expectancy theory provided a framework to identify relevant individual characteristics. As mentioned, three categories of individual characteristics were identified as relevant: work orientation, achievement-striving orientation, and mastery orientation. Characteristics were identified that could be expected to impact these three dimensions of motivation.

Work orientation. Three individual dispositions (career motivation, job involvement, organizational commitment) are particularly linked to propensity through motivation as they provide an indication of whether an individual values being professionally effective (i.e., *valence*). The literature suggests individual career variables may enhance motivation to be involved in learning and development activities (e.g., Colquitt, LePine, & Noe, 2000; Noe & Schmitt, 1986; Tannenbaum et al., 1991). Therefore, individuals with a work orientation as demonstrated by higher career motivation, job involvement, and organizational commitment should have a greater desire to be involved in professional learning and development.

Career motivation is defined as the resilience and self-esteem to overcome career barriers and adapt to changing circumstances, realistic insight about self and career, and the extent to which one's identity is tied to career goals and accomplishments (London, 1993; Noe, Noe, & Bachhuber, 1990). Career motivation has been positively related to participation in development behavior (Noe & Wilk, 1993; Sugalski & Greenhaus, 1986).

Job involvement is defined as the degree to which an individual identifies psychologically with work and the importance of work to a person's total self-image (Lodahl & Kejner, 1965). People who are highly involved with their jobs are more likely to be motivated to engage in self-development because participation in training can increase skill levels, improve job performance, and increase feelings of self-worth (Brown, 1996; Mathieu, Martineau, Tannenbaum, 1993). A consistent significant relationship has been shown between job involvement and motivation to learn (Noe & Schmitt, 1986; Tracey, Hinkin, Tannenbaum, & Mathieu, 2001).

Organizational commitment refers to an individual's involvement in and identification with an organization, including an acceptance of and belief in the organization's goals and values, a willingness to exert effort for the organization, and a desire to maintain membership in the organization (Meyer, Allen, & Smith, 1993; Mowday, Porter & Steers, 1982). Organizational commitment, which is also associated with prosocial organizational behaviors such as deliberate self-development, is positively related to motivation to learn, reactions to training, and transfer of training (Brief & Motowidlo, 1986; Mathieu, 1988; Quinones, Ford, Sego, & Smith, 1995).

Taken together, these three constructs reflect an individual's work orientation, and were expected to affect an individual's propensity to perform leader self-development through motivation.

Hypothesis 1. Motivation to perform leader self-development activities mediates the influences of career motivation, job involvement, and organizational commitment on propensity for self-development of leader attributes (SDLA).

Achievement-striving orientation. Need for achievement and locus of control are linked to propensity through motivation as they provide evidence that individuals will engage and persist in training activities because they believe their efforts will influence achieving the secondary goal (i.e., *Instrumentality*). The literature indicates that variables with an achievement-striving orientation may enhance motivation to initiate and sustain learning and development activities (e.g., Noe & Schmitt, 1986; Phillips & Gully, 1997). Therefore, individuals with higher achievement-striving orientation as

demonstrated by higher need for achievement and an internal locus of control should have a greater impetus to perform self-development.

Need for achievement is characterized by an individual's commitment to the pursuit and accomplishment of goals (McClelland, 1975). Individuals who have high need for achievement seek challenging tasks and responsibility and are described as having a drive to persist in attaining goals (Brunstein, Schultheiss, & Maier, 1999). Phillips and Gully (1997) found that higher need for achievement related to the pursuit of higher performance standards.

Locus of control reflects the degree to which individuals perceive events to be under their control (internal locus) or under the control of others (external locus; Deci, Koestner, & Ryan, 1999). Baron (1995) proposed that because individuals with an internal locus of control more strongly believe they can influence their own outcomes, they attempt to do so more frequently than individuals with an external locus of control. In addition, Noe (1986) suggested that individuals with an internal locus of control have more positive attitudes toward training opportunities because they are more likely to feel that training will result in tangible benefits.

Together, need for achievement and locus of control were predicted to affect propensity for leadership self-development through motivation.

Hypothesis 2. Motivation to perform leader self-development activities mediates the influences of need for achievement and locus of control on propensity for SDLA.

Mastery orientation I. General self-efficacy, conscientiousness, openness to experiences, and learning goal orientation are linked to propensity through motivation as they are enablers for novel learning and development programs, supporting an individual's belief that they can successfully develop and conduct their own leadership development program (i.e., *Expectancy*). The literature supports the assertion that individual qualities that act as personal enablers are linked to motivation to learn (e.g. Colquitt & Simmering, 1998; Farr, Hoffman, & Ringenbach, 1993; Noe & Wilk, 1993). Therefore, individuals who are more self-efficacious, conscientious, open, and demonstrate a greater learning goal orientation should have a greater attraction to performing self-directed learning. Because most of these characteristics were also predicted to affect propensity through skills, the effects on relevant skills will be summarized here as well, in the interest of efficiency.

Self-efficacy refers to individuals' judgments of their own capabilities to organize and execute courses of action required to attain designated types of performance (Bandura, 1986). Efficacy expectations are hypothesized to determine if behavior will be initiated and is predictive of participation in learning activities (Maurer & Tarulli, 1994; Noe & Wilk, 1993; Zimmerman, 2000) perhaps because interest in such activities are enhanced when employees believe they have the capabilities to succeed. With respect to skills, self-efficacy is a critical component of the self-regulatory processes and influences goal setting, self-monitoring, and self-evaluation. Efficacious students set more challenging goals (Zimmerman, Bandura, & Martinez-Pons, 1992) are better at self-monitoring (Bouffard-Bouchard, Parent, & Larivee, 1991) and self-evaluating (Zimmerman & Bandura, 1994), and use a greater variety of learning strategies (Zimmerman & Martinez-Pons, 1990).

Conscientiousness is a trait reflecting such qualities as being reliable, hardworking, self-disciplined, and persevering (McCrae & Costa, 1987). Highly conscientious individuals are more likely to take the initiative to seek out training opportunities (Martocchio & Judge, 1997). With respect to skills, conscientiousness is also considered promising in predicting training proficiency (Barrick & Mount, 1991; Hogan & Ones, 1997) and goal setting and striving (Austin & Klein, 1996).

Openness to experience refers to how willing people are to make adjustments in notions and activities in accordance with new ideas or situations. Individuals who score high on this dimension are believed to be more likely to have positive attitudes toward learning experiences in general (Barrick & Mount, 1991).

Learning goal orientation is strongly related to participation in voluntary job- and career-planning activities (Birdi et al., 1997). Individuals with a strong learning orientation are characterized as having a desire to increase task competence, view achievement situations as a challenge, adopt more difficult goals, and persevere in the face of adversity (Beaubien & Payne, 1999), characteristics that relate to both motivation and skills. Beaubien and Payne's meta-analysis reported a positive correlation between learning goal orientation and self-set goal levels. Learning goal orientation was also associated with greater effort in complex learning strategies (Fisher & Ford, 1998; Ford, Smith, Weissbein, Gully, & Salas, 1998) and greater engagement in self-regulated learning (Covington, 2000; Dweck & Leggett, 1988; Pintrich & DeGroot, 1990).

As a group, these characteristics comprise an individual's mastery orientation, and we predicted that they would affect an individual's propensity to self-develop through motivation.

Hypothesis 3. Motivation to perform leader self-development activities mediates the influences of self-efficacy, conscientiousness, openness to experiences, and learning goal orientation on propensity for SDLA.

Skills

The skills necessary for individuals to perform leader self-development can be described as a synergy between instructional technology and self-regulatory skills. The instructional technology system provides a context for identifying and framing the instructional skills critical to self-development (Goldstein, 1993). These skills include 1) diagnosing learning needs, 2) designing and setting developmental goals, 3) identifying the developmental process, and 4) evaluating personal learning progress.

Self-regulation theory provides a complimentary approach for discussing leader self-development skills as the focus transitions from the external to an internal instructional training system, in which the self is responsible for performing needs analysis, goal setting, process identification, and progress evaluation. Self-regulation implies a process of establishing performance goals, planning, and monitoring their accomplishment (Murphy, 2002), and it comprises three major components: self-monitoring, self-evaluation, and self-reaction (Kanfer, 1990; Kanfer & Ackerman, 1989). As indicated previously, three categories of individual characteristics were identified as relevant to self-development skills: mastery orientation, career-growth orientation, and cognitive ability.

Mastery orientation II. The individual characteristics of general self-efficacy, conscientiousness, learning goal orientation, metacognition, and intellectual maturity are linked to propensity through skills, as they are enabling characteristics for performing self-regulatory behaviors. Research has provided evidence that these characteristics are critical prerequisites of the self-regulatory processes and are associated with greater learning proficiency (e.g., Bandura, 1986; Hogan & Ones, 1997; Kanfer, 1992; Pintrich & DeGroot, 1990). Therefore, individuals who are more self-efficacious, conscientious, learning goal oriented, metacognitive and intellectually mature should have greater skills to perform self-development.

Because self-efficacy, conscientiousness, and learning goal orientation were defined and discussed under the Motivation section, including their relevance to requisite skills they will not be discussed again in this section.

Metacognition is defined as an individual's knowledge of and control over their cognitions, or the ability to think about thinking (Flavell, 1987). Metacognition addresses self-monitoring processes (Garrison, 1997) and is an essential prerequisite for self-regulation (Kanfer, 1992). Individuals with greater ability to metacognate are hypothesized to learn more effectively because they monitor their progress, determine when they have problems, and adjust their learning accordingly (Ford et al., 1998). Research examining metacognition in formal training environments has found positive relationships between metacognition and academic performance (e.g., Ford et al., 1998; Pintrich & DeGroot, 1990).

Intellectual maturity involves a sophisticated understanding of the nature of knowledge including a comfortable acceptance of the ambiguities, uncertainties, and limitations inherent in achieving knowledge (Dean, 1967). Individuals with high intellectual maturity develop positions based on their own judgments and synthesis rather than relying on the advice of others and are associated with independent learners and successful technical professional updating behaviors (Johnson, 2000; Perry, 1981). Individuals with high intellectual maturity are believed to be more able to set goals and form strategies, including identifying learning resources.

As a group, these five individual characteristics, self-efficacy, conscientiousness, learning goal orientation, metacognition, and intellectual maturity, were predicted to affect propensity for leader self-development through skills.

Hypothesis 4. Skill to perform leader self-development activities mediates the influences of general self-efficacy, metacognition, conscientiousness, learning goal orientation, and intellectual maturity on propensity for SDLA.

Career-growth orientation. Two individual dispositions (career exploration and feedback seeking) are particularly linked to propensity through skills as they provide an indication of an individual's inclination toward gaining insight on organizational goals and personal performance. The literature suggests that these career-growth oriented variables are associated with skills needed to accurately identify professional strengths and weaknesses (e.g., London & Mone, 1999; Stumpf, Colarelli, & Hartman, 1983). Therefore, individuals with a greater orientation toward career exploration and feedback seeking should be more likely to perform needs analysis and self-monitoring behaviors.

Career exploration refers to the self-assessment of skill strengths and weaknesses, career values, interests, goals, or plans, as well as the search for job-related information from counselors, friends, and family members (Mihal, Sorce, & Compere, 1984; Stumpf, et al., 1983). Individuals with high levels of career exploration orientation identify their strengths, weaknesses, and interests; have a more accurate awareness of their strengths and weaknesses; and are oriented toward self-improvement (Bass, 1990). Noe and Wilk (1993) reported significant relationships between career exploration and number of hours employees planned to spend in non-mandatory training and development activities.

Feedback seeking provides greater insight during self-evaluation, particularly in a leadership context, which requires an understanding of a broad phenomenon of behaviors. Because feedback-seeking behaviors allow managers to detect discrepancies and, as a result, adapt behaviors, Ashford and Tsui (1991) considered it a "central aspect of the self-regulation framework" (p. 253).

Together, career exploration and feedback seeking were predicted to affect propensity for self-development through these skills.

Hypothesis 5. Skill to perform leader self-development activities mediates the influences of career exploration and feedback seeking on propensity for SDLA.

Cognitive ability has received considerable attention as a predictor of training performance (Ree & Earles, 1991; Schmidt & Hunter, 1998). Although mental ability as a requirement for self-development has not been specifically studied, research suggests that individuals with higher intelligence are more capable of performing in less structured training programs (Snow, 1986). Therefore, individuals with higher intelligence are expected to have greater capacity to perform self-development.

Hypothesis 6. Skill to perform leader self-development activities mediates the influences of cognitive ability on propensity for SDLA.

Energy. A high energy level promotes managing or coping with the hectic pace, long hours, and unrelenting demands of most managerial jobs (Bass, 1990; Howard & Bray, 1988). Energy level has not been examined within a training context; however, managers with high energy levels appear more likely to be able to adjust to the additional responsibilities of developing and conducting a successful leadership self-development program so energy was therefore included in the research as an exploratory variable.

The Role of Organizational Support

While the goal of leader self-development is for leaders to initiate and direct their own professional development, an organization's actions or culture could potentially facilitate or reduce leaders' participation in self-development activities. Specific research in the area of organizational support has been sparse and equivocal (Confessore & Kops, 1998). Some research has demonstrated a link between supportive organizational practices and developmental participation and performance (e.g., Baldwin, Magjuka, & Loher, 1991; Hicks & Klimoski, 1987; Maurer and Tarulli, 1994). Other research did not find a significant relationship between organizational support and measures of self-development activity (e.g., Kozlowski & Hults, 1987; Noe & Wilk, 1993).

Nevertheless, work-related self-development is more likely to occur in organizations characterized as "learning organizations" (Confessore & Kops, 1998). A learning organization is described as one that "facilitates the learning of all its members and continually transforms itself" (Pedler, Burgoyne, Boydell, 1989, p. 2). There are potentially many organizational variables associated with learning organizations that might facilitate participation in leader self-development activities, such as the presence of a participative management style, an innovative culture, employee empowerment and autonomy, and social support (Confessor & Kops, 1998; Easterby-Smith, 1997; Maurere & Tarulli, 1994; Noe & Wilk, 1993; Tracey, Tannenbaum, & Kavanagh, 1995; Tracey et al., 2001).

Of the characteristics often associated with a learning organization, providing support is most relevant to this research; one way organizations could support self-development is by providing relevant information and resources. This would be expected to increase employees' motivation and skills to self-develop, and therefore directly relates to the propensity model we are using.

In order to investigate the effects of organizational support, a website was created for this research on the topic of Leader Self-Development. Information and resources were provided on the website regarding topics such as the following: the benefits and advantages of leadership self-development, tools to assess one's motivation to self-develop in leadership and how to interpret the results, guidance for performing a needs analysis, goal setting, process identification, progress evaluation, self-development tools (e.g., learning contract templates), and links to useful leadership self-development web-sites (e.g., Company Command).

We predicted that an organizational level support tool that was developed, maintained, and promoted by the organization, such as this website, could encourage individuals to reassess their values and beliefs about leader self-development and provide tools for individuals to acquire the skills necessary to perform self-development. In developing a specific hypothesis, we found research by Tharenou (2001) that supported an interaction effect between organizational support and individual expectancy motivation on participation in training and development programs.

We hypothesized that a similar moderation would apply to this sample. Because individuals with low propensity do not have sufficient motivation and skills to initiate access to such a support tool, however, the availability of organizational support would not be likely to influence their self-development activities. At the other end of the spectrum, individuals with high propensity already have high motivation and skills to perform leader self-development, so the availability of organizational support that focuses on increasing motivation and developing skills for self-development are not as likely to affect their self-development activities. Therefore, we predicted that individuals with moderate levels of motivation or skills would be more likely to engage in leader self-development when they have information and access to the organizational support website, than when they do not have this type of support.

Hypothesis 7. The relationship between propensity for SDLA and leader self-development activities is moderated by organizational support, such that individuals with moderate propensity will demonstrate greater performance of leader self-development in a condition in which the organization provides leadership self-development guidance, information, and resources.

Method

Participants

Participants were leaders completing a six-week professional military education (PME) program. Students were initially asked to participate in research to "aid the understanding of leadership self-development" and were informed that their responses were confidential and for research purposes only. Of the 561 students enrolled in the program, 498 volunteered to participate in the research.

Participants ranged in age between 22 and 45 with the average age of 29 years. All volunteers were Army Officers, and as such all respondents had a bachelor's degree with nearly 20% having completed postgraduate work. Eighty-eight percent of the sample was male, and 97% held the rank of Captain. The ethnic composition of the sample was 75% Caucasian, 10% African American, 6% Hispanic, 3% Asian, 2% Pacific Islander, 1% American Indian, and 3% other. Most participants (95%) had more than four years of supervisory experience, supervising an average of 40 subordinates. The majority were from Combat Arms branches (55%), with 22% from Combat Support, 21% from Combat Service Support, and 3% from other branches (e.g. Medical).

Procedure

In total, three surveys were administered. The first survey included demographic and individual characteristic items, and was administered midway through the PME program. The second survey, which included leader self-development motivation, skills, and propensity measures, was administered two weeks later. Approximately 90% of the volunteers completed both survey packets during their personal time with 471 and 443 respondents completing Surveys 1 and 2, respectively. Surveys with no individual identification information, little or no variance, systematic responses, or missing critical data were

disregarded, resulting in 396 respondents providing usable data and an adequate sample size for the mediation analyses. No systematic differences were found with the demographic data of the discarded surveys.

Following the first two surveys, all students were randomly assigned to participate in one of two 50-minute presentations on leader self-development. Each group of approximately 280 officers received a 30-minute standardized briefing that defined and described leader self-development and provided an overview of the purpose, benefits, and processes of developing and performing a leadership self-development program. After the standardized briefing, half of the students received information and access to a website hosted by the U.S. Army Research Institute for the Behavioral and Social Sciences (ARI) that provided guidance, information, and resources on why, what, and how to perform leader self-development. The other half were shown approximately 15 minutes of humorous job-related cartoons and quotes. Shortly after the day of the presentations, students left the PME to return to units.

Finally, a third survey measuring the performance of leader self-development, was administered four months after the leaders completed their PME program, following Dillman's (2000) multiple contact protocol. Of the 177 leaders completing the third survey, data from 141 respondents were usable. This provided an adequate sample size for the moderation analysis. Seventy-three (52%) of the respondents had received information and access to the ARI leader self-development website.

Measures

Individual characteristics. The fifteen individual disposition constructs were measured in the first survey using established scales. These measures were career motivation, job involvement, organizational commitment, need for achievement, locus of control, general self-efficacy, openness and conscientiousness, learning goal orientation, intellectual maturity, metacognition, career exploration, feedback seeking, cognitive ability, and energy level. Table 1 summarizes each measure and lists any peculiarities associated with the scale. Unless noted, all scales used a 7-point Likert scale ranging from 1 (Strongly Disagree) to 7 (Strongly Agree).

Motivation. The ten-item scale from Sanchez, Truxillo, and Bauer (2000) was adapted to measure motivation to self-develop across eight competencies identified as essential for Army officer leadership performance. These eight competencies included communication, decision-making, planning, professional ethics, team development, supervision, teaching/counseling, and technical proficiency (Halpin & Karrash, 2001). A composite variable was created by adding the valence, instrumentality, and expectancy values for each participant ($\alpha = .98$).

Skills. A 16-item, self-evaluation measure was developed, based on Knowles' (1975) Competencies of Self-Directed Learning: A Self-Rating Instrument, to assess the extent to which individuals perceived that they had the four fundamental skills necessary to perform self-development ($\alpha = .96$).

Self-regulatory skills were assessed using a measure from Pintrich and DeGroot (1990), the self-regulated learning scale. This 12-item measure used a 7-point Likert scale and had an internal reliability of .82. A composite variable was created by adding the self-development skills and self-regulation processes for each participant.

Propensity to leadership self-develop. The Propensity to Leadership Self-Develop measure was adapted from Day, Bedeian, and Conte (1998) and London et al. (1999) and used a 5-point Likert scale.

Table 1.

Measures: Individual Characteristics

Individual Characteristic	Source	Items	Alpha	Notes
Career Motivation	London, 1993	17	.88	Career motivation defined in terms of insight, identity, and resilience
Job Involvement	Lodahl & Kejner, 1964	6	.76	Example item includes, "The major satisfaction in my life comes from my job"
Organizational Commitment	Mowday, Steers, & Porter, 1979	9	.89	Participants responded in reference to organization they worked (i.e., U.S. Army)
Need for Achievement	Fineman, 1976	18	.61	The Self-Description Questionnaire adapted from Ghiselli (1954) consists of forced-choice adjectives pairs with respondents selecting the most or least self-descriptive adjective in each pair. Reported internal reliability ranged from .70 to .79
Locus of Control	Rotter, 1966	14	.63	The 14-item version of Rotter's scale used in previous investigations (e.g., Greenberger, Strasser, Cummings, & Dunham, 1989; Howell & Avolio, 1993) has reported reliability of .72
General Self-Efficacy	Chen, Gully, & Eden, 2001	8	.95	The more general, trait-like aspects of self-efficacy are more useful when trying to understand performance over time and captures individual differences in people's tendency to view themselves as capable of meeting task demands in a wide a variety of situations (Chen, Gully, Whiteman, & Kilcullen, 2000)
Openness & Conscientiousness	Saucier, 1994	8 8	.85 .79	Individuals used a 9-point scale to rate the accuracy of both characteristics in describing themselves (1 = Extremely Inaccurate to 9 = Extremely Accurate).
Learning Goal Orientation	Button, Mathieu, & Zajac, 1996	8	.92	Only the eight-item learning subscale of this two-subscale measure (learning and performance) was included in the study
Intellectual Maturity	Dean, 1967	22	.84	Used two subscales, judgment and intellectual maturity, of the multidimensional measure
Metacognition	Pintrich, Smith, Garcia, & McKeachie, 1991	12	.80	The Metacognitive Self-Regulation Scale items were adapted to generalize the college-orientation of the measure to a larger learning environment.
Career Exploration	Stumpf, Colarelli, & Harman, 1983	14	.80	Used self-exploration, environment exploration, and intended-systemic exploration subscales of the Career Exploration Survey
Feedback Seeking	Ashford, 1986	7	.83	Measure examines two strategies: monitoring and inquiry
Cognitive Ability	Wonderlic Personality Test, 1992	50	.88	Participants were given 12 minutes to complete the 50-item instrument, with items increasing in difficulty
Energy Level	Jackson, 1994	20	.73	The Jackson Personality Inventory-Revised subscale consist of 20 true-false statements

An example of an item from each scale, respectively, is "If I had no constraints (e.g., financial, time, etc.), I would perform self-development activities to become a better leader" and "After graduating from [program name], I will perform self-directed learning activities to acquire new leadership knowledge." The scale showed a coefficient alpha reliability of .89.

Criterion Measures. Three self-report measures of leader self-development performance were used in this research. An overall leader self-development measure was adapted from London et al. (1999) to capture activities engaged in during the specified timeframe ("LSD Rating"). An example of the revised items includes: "During the last three months, I intentionally performed self-directed learning activities to acquire new leadership knowledge." Participants provided ratings on four items using a 5-point Likert scale reflecting their performance of leader self-development activities ($\alpha = .95$).

A leader self-development activity measure was adapted from Tough's (1971) interview protocol to assess the "patterns and purposes" of self-development learning activities. These items explored the nature of the participant's learning project, as well as their use of resources as part of the learning process ("LSD Activities") ($\alpha = .93$). A quantitative measure was also collected by asking participants to write in the total hours they spent performing leadership self-development activities ("LSD Hours").

Results

Descriptive Analyses

Violations for distribution assumptions associated with the planned analyses were tested. Several of the variable distributions, including those for Career Motivation, Organizational Commitment, Locus of Control, General Self-Efficacy, Conscientiousness, Learning Goal Orientation, Intellectual Maturity, Career Exploration, Feedback Seeking, Energy Level, Motivation, and Skills deviated significantly from normal (see Table 2). In general, the scales showed significant negative skew and positive kurtosis. This was not necessarily surprising given that, as a group, these officers were expected to be highly motivated, committed, confident, and skilled. This would tend to produce greater frequencies at the upper end of the distributions as well as a stronger concentration of scores around the high median values. To prevent violating the assumptions of normal distributions for the multivariate analyses, appropriate transformations were made to achieve acceptable distributions for each variable. The transformed variables were used in the remaining analyses unless otherwise noted.

Descriptive statistics, correlations, and reliabilities for the 15 individual characteristics, motivation, skills, propensity, and the criterion variables are presented in Table 3. Means and standard deviations are based on non-transformed scales, but correlation coefficients reflect transformations. Using Hemphill's (2003) guidelines for large effect size, which corresponds to Cohen's (1988) medium effect size, correlation coefficients greater than .30 are highlighted. As shown, several of the individual characteristics (e.g., General Self-Efficacy and Learning Goal Orientation; Organizational Commitment and Career Motivation), are highly correlated ($r > .60$).

Multicollinearity was found among the independent variables (Condition Indices > 30 and two Variance Proportions $> .5$), so a Confirmatory Factor Analysis was performed on the individual disposition scales to address multicollinearity concerns and reduce the number of variables for the mediated analysis. Tests of correlations indicated favorable factorability and the Kaiser's measure of sampling adequacy was .86, exceeding the .60 recommended by Tabachnick and Fidell (1996). Principal factor analysis with varimax rotation extracted five factors (Mastery Orientation, Work Orientation, Career Growth Orientation, Achievement-Striving Orientation, and Cognitive Ability). The lowest SMC

Table 2. *Transformations Due to Variable Normality Problems*

Variable	N	Pre Transformation		Transformation	Post Transformation		Reflected ^a
		Skew (Z)	Kurtosis (Z)		Skew (Z)	Kurtosis (Z)	
Career Management	470	-14.27	26.93	LG10(8-x)	1.46	2.15	X
Organizational Commitment	471	-8.09	3.96	LG10(8-x)	-0.41	-2.76	X
Learning Goal Orientation	471	-15.79	25.58	LG10(8-x)	3.22	-0.50	X
Locus of Control	466	-4.70	1.36	LG10(13-x)	-1.33	-0.10	X
Conscientiousness	463	-4.14	1.31	SQRT(10-x)	0.65	-2.58	X
General Self-Efficacy	470	-17.73	31.47	LG10(8-x)	3.43	0.28	X
Career Exploration	462	-5.20	6.46	SQRT(6-x)	0.68	3.55	X
Emotional Maturity	468	-3.46	-0.95	SQRT(7.95-x)	0.93	-1.30	X
Feedback Seeking	461	-3.75	1.96	SQRT(6-x)	-0.52	0.90	X
Energy Level	463	-5.94	0.76	SQRT(6-x)	0.10	-2.16	X
Motivation	440	-4.17	0.51	SQRT(22-x)	-1.83	-0.95	X
Valence	443	-14.24	19.64	1/(8-x)	2.10	-5.63	
Instrumentality	441	-9.19	7.87	LG10(8-x)	-2.52	1.03	X
Expectancy	441	-5.10	-1.54	SQRT(8-x)	0.59	-3.16	X
Skills	435	-5.92	3.97	SQRT(35.83-x)	-1.12	2.87	X
Training Skills	435	6.23	4.25	SQRT(29-x)	-1.78	2.66	X
Self-Regulation Skills	441	-4.20	2.55	SQRT(8-x)	-0.15	1.37	X
Total LSD Hours	157	15.12	24.03	1/(x+1)	9.89	5.01	X
Total Combined Hours	143	26.15	85.06	1/(x+1)	18.19	33.05	X

Note. Conventional but conservative alpha levels (.001) used to evaluate significance.

^a Interpret all reflected variables in opposite direction (i.e., reverse scale 1=7, 7=1)

Table 3.

Means, Standard Deviations, Correlations, and Reliabilities Among Key Variables

Variables	M	SD	Min	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1. Career Motivation (T)	5.72	0.70	2.2	7.0	(.88)																				
2. Job Involvement	3.99	1.10	1.0	6.8	.47	(.76)																			
3. Organizational Commitment (T)	5.45	1.04	2.0	7.0	.60	.48	(.89)																		
4. Need for Achievement	9.08	2.54	2.0	14.0	.28	.19	.17	(.61)																	
5. Locus of Control (T)	9.98	2.66	1.0	15.0	.14	.16	.14	.21	(.63)																
6. General Self Efficacy (T)	6.11	0.78	1.9	7.0	.72	.17	.40	.26	.21	(.95)															
7. Conscientiousness (T)	6.92	1.19	2.8	9.0	.42	.14	.23	.19	.19	.49	(.85)														
8. Openness to Experience	6.56	1.06	3.1	9.0	.32	.05	.13	.20	.09	.42	.40	(.79)													
9. Learning Goal Orientation (T)	6.03	0.81	1.0	7.0	.69	.30	.41	.23	.24	.69	.45	.37	(.92)												
10. Intellectual Maturity (T)	5.41	0.62	3.6	7.0	.48	.08	.26	.20	.24	.59	.58	.43	.58	(.84)											
11. Metacognition	4.77	0.79	2.5	7.0	.51	.25	.40	.17	.10	.46	.34	.36	.52	.46	(.80)										
12. Career Exploration (T)	3.62	0.57	1.0	5.0	.42	.14	.25	.26	.04	.35	.22	.32	.36	.25	.39	(.80)									
13. Feedback Seeking (T)	3.53	0.66	1.1	5.0	.34	.16	.26	.13	.06	.22	.12	.14	.22	.09	.29	.56	(.83)								
14. Energy Level (T)	14.42	3.73	0.0	20.0	.32	.18	.26	.33	.29	.29	.32	.23	.33	.33	.30	.23	.15	(.73)							
15. Cognitive Ability	29.25	5.57	12.0	44.0	-.13	.02	-.06	.10	.11	-.05	.04	.16	-.05	.04	-.14	-.07	-.07	-.05	-						
16. Motivation (T)	16.12	2.80	5.7	21.0	.25	.08	.18	.02	.03	.19	.14	.15	.22	.15	.28	.17	.17	.04	-.02	(.98)					
17. Skills (T)	26.20	4.01	8.1	34.8	.35	.13	.24	.13	.06	.35	.29	.22	.36	.33	.37	.24	.18	.18	-.02	.50	(.93)				
18. Propensity to SDLA	3.58	1.09	1.0	5.7	.23	.14	.25	.09	.06	.21	.11	.16	.28	.12	.31	.20	.18	.11	.01	.53	.37	(.89)			
19. Total Performance	3.00	1.13	1.0	5.0	.26	.18	.25	.15	.06	.19	.29	.08	.25	.22	.31	.21	.05	.20	-.03	.13	.12	.34	(.95)		
20. Total Activity - Quality	2.83	1.04	1.0	5.0	.23	.16	.32	.12	-.03	.14	.23	.04	.20	.14	.19	.13	.10	.11	-.02	.23	.12	.39	.80	(.93)	
21. Total Hours - Quantity	55.57	89.90	0.0	450.0	.19	.05	.15	.14	-.06	.16	.13	.00	.16	.17	.24	.17	.03	-.03	-.04	.07	.13	.28	.46	.48	-

Notes. Correlations were estimated using pairwise deletion; individual disposition, motivation, skills, and propensity variables (variables 1 - 18) sample size ranging from 327 to 396; performance variables sample sizes were 133. Correlations greater than .13 are significant at $p < .01$ for variables 1 thru 18.

Correlations with variables 19 thru 21 greater than .17 are significant at $p < .05$; correlations greater than .22 are significant at $p < .01$. Coefficients greater than .30 are bolded. Reflected correlation coefficients resulting from transformations (T) have been corrected for interpretation. Numbers in parentheses along the diagonal are reliabilities.

Table 4.

Individual Characteristics Variables Factor Loadings, Communalities, Variance, Covariance, and Correlations

Variables	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Communality
Factor Labels	Mastery Orientation	Work Orientation	Career-Growth Orientation	Achievement-Striving Orientation	Cognitive Ability	H ²
General Self-Efficacy (T)	0.78	0.30	0.15	0.08	0.01	0.73
Intellectual Maturity (T)	0.77	0.04	-0.01	0.26	0.02	0.67
Learning Goal Orientation (T)	0.65	0.35	0.18	0.19	0.12	0.62
Conscientiousness (T)	0.61	0.05	0.06	0.25	-0.04	0.45
Openness to Experience	-0.53	0.04	-0.29	-0.13	0.19	0.41
Metacognition	-0.51	-0.20	-0.31	-0.16	-0.17	0.45
Career Motivation (T)	0.56	0.64	0.26	0.11	0.13	0.82
Job Involvement	0.01	-0.64	-0.08	-0.24	0.06	0.48
Organizational Commitment (T)	0.23	0.63	0.14	0.15	0.06	0.50
Career Exploration (T)	0.23	0.06	0.85	0.11	0.02	0.79
Feedback Seeking (T)	0.07	0.17	0.55	0.05	0.03	0.34
Energy Level (T)	0.25	0.15	0.15	0.64	0.09	0.53
Locus of Control (T)	0.18	0.20	-0.04	0.42	0.08	0.26
Need for Achievement	-0.15	-0.14	-0.19	-0.36	0.14	0.23
Cognitive Ability	0.02	0.02	0.03	0.05	0.64	0.42
SSLs	3.08	1.60	1.42	1.04	0.55	7.68
Proportion of variance	.21	.11	.09	.07	.04	.51
Proportion of covariance	.40	.21	.18	.14	.07	
F1: Adult Learning						
F2: Work Focus	0.09					
F3: Work Insight	0.03	0.07				
F4: Self Focus	0.17*	0.13	0.03			
F5: Cognitive Ability	0.04	-0.02	-0.03	0.09		

Notes. Principal Axis Factoring on transformed (T) data with Varimax Rotation. N= 396

* p < .05; ** p < .01

was .56, indicating that the five factors were internally consistent and well defined by the variables. A cut value of .32 (10% of variance) was used for variable inclusion. All 15 variables loaded on at least one factor with factor content based on the highest loading. Loadings of variables on factors, communalities, proportions of variance and covariance, and factor correlations are shown in Table 4.

Finally, analyses were also performed to ensure that subject characteristics were similar across the three surveys and between the manipulation groups. No differences in measured individual demographic and dispositions data were found between participants completing each survey or between individuals who did or did not receive organizational support information.

Leader Self-Development Performance

Of the 141 officers who responded to the criterion measures in the third survey, only 22% indicated they had spent 7 or fewer hours on leader self-development during the last three months, with 14% specifically indicating they had not spent any time performing leader self-development (see Table 5). Nearly 50% reported performing leader self-development activities for 20 or more hours. When officers were asked to provide a rating to describe the extent to which they performed leader self-development during the last three months, responses were evenly distributed, with 32% reporting they performed leader self-development to a "very little" or "small extent", 29% reporting "some" leader self-development, and 39% reporting a "large" or "great extent." Similarly, when officers were asked specifically to what extent they used the self-regulatory training skills to develop specific leadership competencies, similar results were found.

With respect to their ability and motivation to perform leader self-development, officers in general indicated a neutral to moderate level of motivation and a moderately high self-perceived ability to perform leader self-development (see Table 6). Of particular interest was the variation in overall responses to the valence, instrumentality, and expectancy measures of motivation. Valence assessments received the highest ratings with instrumentality and expectancy assessments receiving relatively lower ratings. These scores suggested that while officers valued being a more effective leader, they were less inclined to believe that self-developing leadership skills would lead to becoming a more effective leader, and even less likely to believe that they could successfully develop a conduct a personal leadership self-development program.

The specific leader competency for which officers reported spending the greatest number of hours on self-development was technical/tactical proficiency, with an average of 17.5 hours spent on self-development in this area (see Table 7). Competencies receiving the least self-development focus were teaching, counseling, and professional ethics. Also of interest is that there was little relationship between the motivation and abilities to self-develop a certain competency and the actual self-development of that competency. In other words, even though students had identified particular competencies as needing development and they indicated that they had the skills to develop those competencies, they did not necessarily spend time or effort self-developing the competencies they had identified.

Comparisons between officers who did and did not perform leader self-development revealed a few interesting differences. First, those who performed self-development were more likely to be en route to their next duty station, as opposed to attending in a temporary duty status (TDY) and returning to an assignment. Second, they were more likely to be married (or remarried) rather than single and never married. Finally, they were characterized by high levels of valence for being an effective leader, and moderate levels of ability to perform self-development, which suggests that officers performing leader self-development valued being a more effective leader and were more skilled at performing self-development than their counterparts who did not perform leader self-development.

Table 5

Leadership Self-Development Performance: Time Spent Performing, Extent Leadership Self-Development Performed, and Extent Leadership Self-Development Behaviors and Activities Performed.

Total Hours Spent¹	Percent	Extent Self-Development Performed²	Percent	Extent Behaviors and Activities Performed²	Percent
0 – 7	22%	Small- Very Little	31.8%	Small- Very Little	38.6%
8 – 19	29%	Some	29.2%	Some	32.7%
20 – 84	31%	Large -Great	38.8%	Large -Great	28.7%
85 – 200	11%				
200 – 450	7%				

¹ By definition, self-development involves performing learning activities that add up to at least seven hours (Tough, 1971 in Brockett & Hiemstra, 1991, p. 41).; ² 5-point Likert Scale (1 = To a very little extent; 5 = To a very great extent)

Table 6

Motivation and Skills: Officer Ratings of Motivation and Ability to Perform Leadership Self-Development

Variable	Mean	SD	NP³
<u>Motivation¹</u>			
Valence	6.35	0.88	
Instrumentality	5.14	1.22	
Expectancy	4.67	1.72	
<u>Ability to Perform²</u>			
Needs Analysis	5.50	0.91	4%
Goal Setting	5.17	1.04	4%
Process Identification	5.13	1.10	6%
Progress Evaluation	5.41	1.05	4%
Metacognitive Strategies	4.72	0.88	
Effort Management Strategies	4.77	1.10	

¹ 7-point Likert Scale (1=very undesirable/very unlikely; 7 = very desirable/very likely); ² 7-point Likert Scale (1 = Very Low; 7 = Very High); ³ NP = Never Performed

Table 7

Self-Development of Competencies: Time Spent Performing and Extent Leadership Self-Development Behaviors and Activities Performed.

Competency	Hours Spent	Extent Performed ¹
Technical/Tactical	17.5	2.58
Planning	15.7	2.42
Decision Making	13.9	2.26
Communication	12.0	2.16
Team Development	11.7	2.08
Supervisory	10.7	2.12
Teaching/Counseling	7.9	2.02
Professional Ethics	6.8	1.72

¹ 5-point Likert Scale (1 = To a very little extent; 5 = To a very great extent)

When asked to select from 21 factors that "prohibited or inhibited" performing leader self-development, the most commonly selected response for all officers was "Lack of time" (68%). Other commonly selected responses were "job responsibilities" and "home/family responsibilities" (see Table 8). A number of items on the list were selected by fewer than 5% of the officers, including lack of childcare, dislike studying, and lack of family/friends support.

In order to determine if certain sources of information were more useful than others for leader self-development, a list of 20 possible self-development resources was provided and officers were asked how useful each resource was to their self-development. Most items received mean ratings corresponding to "Slightly useful." Only three categories received mean ratings corresponding to "Moderately useful" and "Very useful": (1) Reading (Journals, Magazines, Books), (2) Internet, and (3) Peers, co-workers, family.

Table 8.

Barriers to Leader Self-Development Performance

Item Listed	Percent Who Selected This Response
Lack of time	68%
Job responsibilities	56%
Home/Family responsibilities	28%
Lack of supervisor support	18%
Lack of unit support	18%
Lack of place to study/practice	16%
Lack of information on how to perform LSD	15%
Lack of Army support	11%
Lack of relevance	10%

With respect to the website developed for this research, web tracking data showed that the website was accessed and used, and that files were downloaded from the site. Unfortunately, due to a server migration during the data collection phase, specific data regarding the visitors and viewing patterns on the website were unreliable. For example, there were 89 visitors to the website who made 127 visits, but due to missing web tracking data we could only confirm that 22 of these visitors and 36 of the visits were from officers participating in the research. While it is possible that some of the other 67 visitors could have been persons who were not part of the research, the occurrence of non-authorized visitors to the website would have been unlikely as precautions were taken to minimize access to the website to only research participants receiving organizational support. We therefore share the results from the website data collection as they are interesting and can inform future efforts. Caution is urged, however, to ensure the results are not given inappropriate confidence.

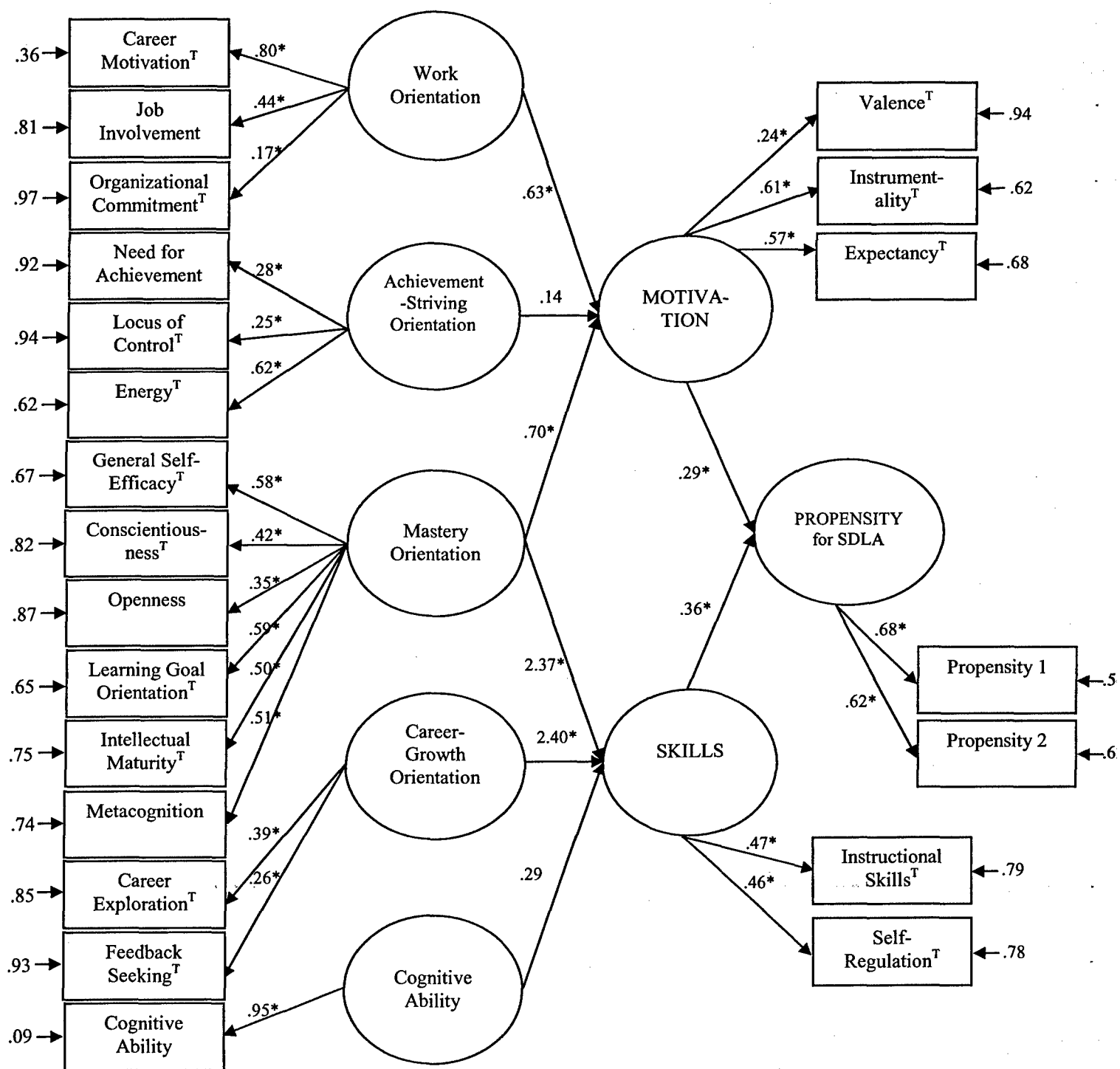
Of particular interest is that the majority of web activity occurred during the week but during off duty hours (e.g., after or before work and during lunch hours). The average duration of a visit was nearly four hours with the most visited pages involving various stages of development: (1) Overview: Background, (2) Overview: Army Leader Development Model, (3) Abilities: Diagnosing Learning Goals, and (4) Resources: Links. Finally, the files most downloaded were a Learning Contract Template and a Resource Matrix.

Leader Self-Development Model: The Role of Individual Characteristics

In order to evaluate the overall fit of the data to the proposed model, the model was assessed using structural equations modeling, LISREL 8.53. All analyses were performed on covariance matrices. A two-step approach was used to analyze the mediated effects of the individual characteristics on propensity to self-develop (Anderson & Gerbing, 1988). The first step was to examine the measurement model to determine whether the latent constructs specified in the model fit the data well. Next, the hypothesized mediated relationships were tested in the structural model. Satisfactory model fit is indicated when the ratio of the X^2 to the degrees of freedom is less than 2, goodness-of-fit index (GFI) and comparative fit index (CFI) values are greater than .90, root-mean-square error of approximation (RMSEA) values are less than .05, and significant changes occur in chi-square tests (Hoyle, 1995; Tabachnick & Fidell, 1996).

Analysis of the measurement model indicated that the data fit the model reasonably well, GFI = .96, CFI = .96, RMSEA = .017, Standardized RMR = .04. The chi-square examined with respect to the independence model was found to be a significant improvement over the saturated model, $\Delta X^2 ((49) = 1502.94, p < .01)$. In addition, all loadings were significant ($z > 1.96$) (see Figure 2).

The hypothesized structural model tested the mediated relationship between Mastery Orientation, Work Orientation, and Achievement-Striving Orientation, and Propensity for SDLA mediated by Motivation, as well as the relationship between Mastery Orientation, Career-Growth Orientation, and Cognitive Ability and Propensity for SDLA mediated by Skills. The resulting model was similar in fit to the measurement model with acceptable goodness of fit statistics (X^2 ratio = 1.42; GFI = .95, CFI = .95, RMSEA = .023). Inspection of the standardized path coefficients for the hypothesized model showed consistent positive relationships between Mastery Orientation and Motivation, Work Orientation and Motivation, Mastery Orientation and Skills, and Career-Growth Orientation and Skills.



Note. ^T indicates transformed variable.

Figure 2. Leader self-development performance: Mediation model.

No substantial path between the individual disposition factors and mediators was targeted on the hypothesized model's modification indices (Lagrange Multiplier Test). However, two paths were identified as not contributing significantly to the model. The path between Achievement-Striving Orientation and Motivation (standardized coefficient = 0.14) as well as the path between Cognitive Ability and Skills (standardized coefficient = 0.29) were removed with no significant change to model fit ($(\Delta X^2(2) = -2.29, n.s.)$). However, the recommended modified model was slightly more parsimonious with lower AIC ($\Delta = 0.71$) and CAIC ($\Delta = 10.67$) values when compared to the hypothesized model. These results, as illustrated in Figure 3, confirm Hypothesis 1, 3, 4, and 5. Hypotheses 2 and 6 were not supported, however.

Leader Self-Development Model: The Role of Organizational Support¹

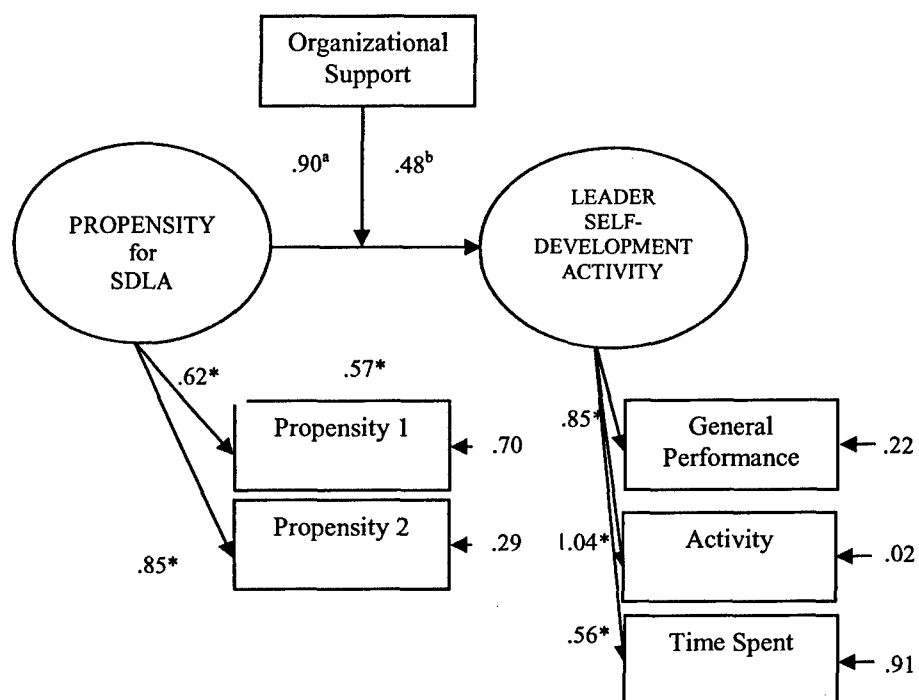
The interaction effect was evaluated using Jaccard and Turrisi's (1996) three-step approach. The overall chi-square from the nonconstrained analysis was 8.46 ($df=8, n.s.$) consistent with a good model fit across the groups. The resulting chi-square for the equality constrained model was 13.29 ($df=9, n.s.$). The chi-squared difference of 4.83 ($df=1, p < .05$) was statistically significant indicating an interaction effect was present. For the group receiving no organizational support, the path coefficient from the latent variable of propensity to performance was 0.90, whereas for the group receiving support the corresponding path coefficient was 0.48. The difference between these two path coefficients was statistically significant, based on the result of the nested fit test. These results indicated that the hypothesized model adequately fit the data (see Figure 3).

In order to examine the nature of the interaction effect, moderated regression was completed according to the procedures presented by Jaccard, Turrisi, and Wan (1990). Significant interaction effects were found for all three measures of performance: LSD Rating ($\Delta R^2 = .03, \Delta F = 4.67, p < .05$), LSD Activities ($\Delta R^2 = .04, \Delta F = 6.03, p < .05$), and LSD Hours ($\Delta R^2 = .04, \Delta F = 6.28, p < .05$), with the latter highlighted in Figure 4. As predicted in Hypothesis 7, low to moderately low propensity individuals performed self-development to a greater extent when they received organizational support than their counterparts who did not receive organizational support. One unexpected finding, however, was that individuals with higher propensity performed more self-development if they did not receive organizational support compared to their colleagues who did receive organizational support.

Discussion

The nature of self-development provides several advantages to training and development, including the ability to tailor learning objectives to meet personal needs, individually pacing activities within available time opportunities, and matching learning resources with individual learning styles (Brockett & Hiemstra, 1991; Piskurich, 1993). DA Pam 350-58 describes self-development as a key element of the foundation for developing Army officers, intending that it be used as a method to enhance, sustain, and expand their leadership capabilities.

¹ It should be noted that the manipulation check that was performed was inconclusive. Several problems with the wording and ordering of the items rendered the responses unclear and the response size insufficient. However, since the manipulation was straightforward (e.g., individuals either received the organizational support tool or did not) and a substantial number of participants either used or did not use the support tool, the manipulation appeared to be effective.



Note. ^a indicates no Organizational Support, ^b indicates Organizational Support, * indicates $p < .05$

Figure 3. Leader self-development performance: Moderation model.

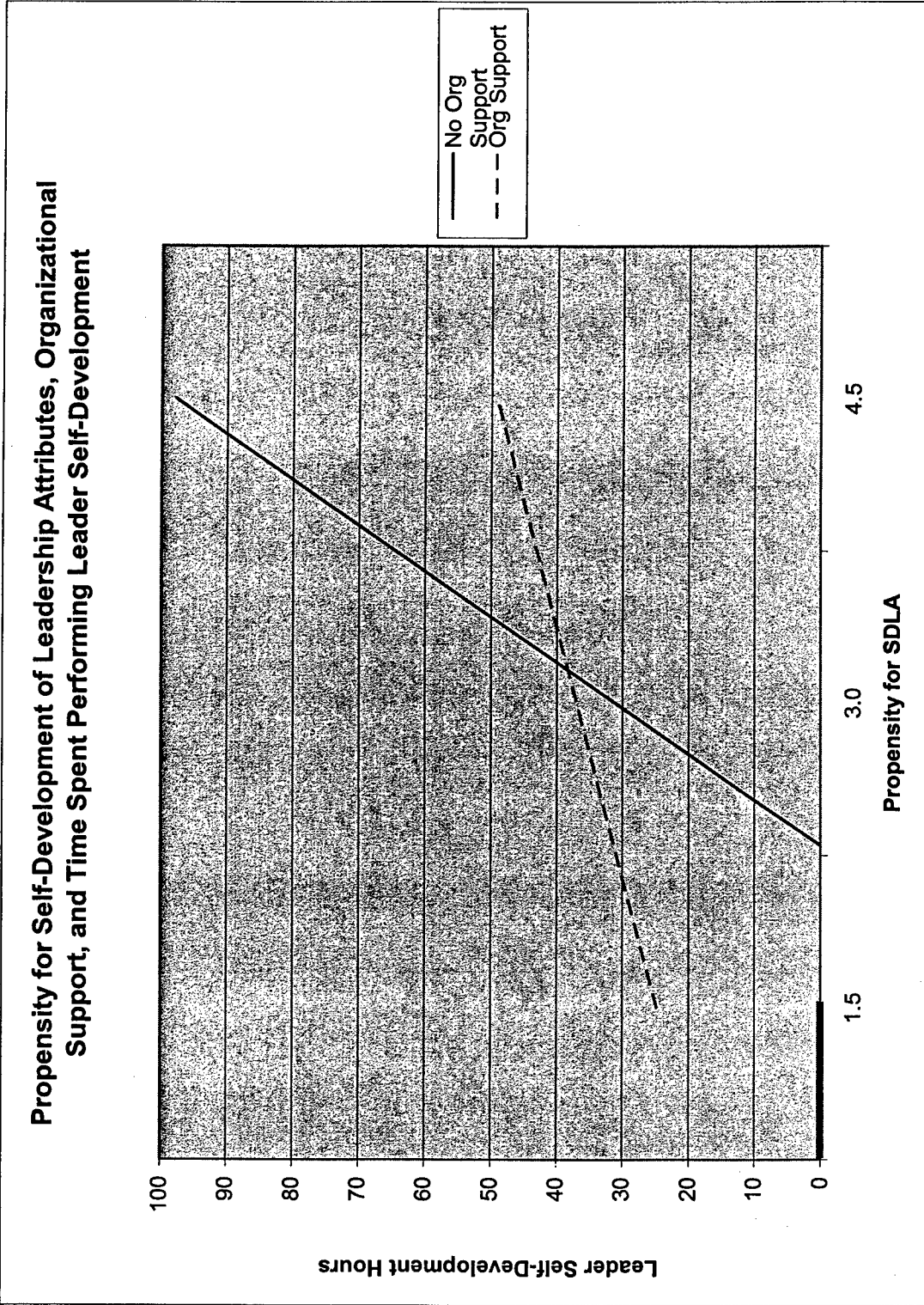


Figure 4. Interaction effect of propensity for self-development of leadership attributes and organizational support on time spent performing leader self-development.

The results of this research provide insights into leader self-development, both theoretical and applied. First, there has been little research on the relationship between individual antecedents and performance of self-directed learning activities, particularly professional or leader self-development (cf., Birdi et al., 1997; Maurer & Tarulli, 1994; Noe & Wilk, 1993). The integrated model describes a theoretical framework of the relevant individual characteristics, providing a greater understanding of which characteristics predict and promote self-development and the mechanisms through which they function.

Further, previous research had not examined the actual effects of providing organizational support on employee self-development (cf., Birdi et al., 1997; Maurer et al., 2003; Tharenou, 2001). This research provided insight into the effects of organizational support, and how the effects differed for individuals with different levels of propensity. Finally, from a purely applied perspective, these results provided interesting descriptive information regarding the extent to which a sample of Army officers engaged in leader self-development and the types of activities in which they engaged.

Understanding Propensity for Leader Self-Development

Results indicated that certain individual characteristics affect the motivation and skills that contribute to a person's propensity to self-develop. Specifically, as predicted, individuals with greater work orientation were more motivated to perform leader self-development, leading to a greater propensity to self-develop. Also, individuals with a greater career growth orientation were more skilled at performing self-development, leading to a greater inclination to self-develop. Individuals with a mastery orientation, exemplifying adult learners, were both more motivated and skilled at leader self-development, leading to a greater propensity to self-develop. Contrary to our hypotheses, however, neither an achievement-striving orientation nor cognitive ability influenced motivation or skills to perform leader self-development.

One explanation for the lack of a direct relationship between the achievement-striving orientation variables and motivation may be the relatively low reliability of the scales measuring need for achievement ($\alpha = .61$) and locus of control ($\alpha = .63$). Nunnally (1978, p. 245) recommends that instruments used in basic research should have "reliabilities of about .70 or better." In addition, the third variable in the Achievement-Striving Orientation factor, energy, was included as an exploratory variable with little previous evidence to suggest the nature of its relationship to the other individual dispositional constructs or propensity for self-development. Researchers and practitioners should view the lack of a significant relationship between the Achievement-Striving Orientation variables and propensity with reservation, and consider further exploring the role of these constructs in self-development propensity and performance.

The lack of a relationship between cognitive ability and skill may be a reflection of the participants' uniformly high levels of cognitive ability, with an average Wonderlic Personnel Test (WPT) score of 29.25. The average score for the adult working population on the WPT is 21.75 with scores over 27.0 falling in the third quartile (WPT, 1992). This restricted range would serve to attenuate the relationships with other variables. To the extent that the Army officer population mirrors leaders in commercial businesses, the effect of cognitive ability on self-development activity may be immaterial, as intelligence and leadership have been repeatedly shown to correlate (e.g., Bass, 1990; Lord, DeVader, Allinger, 1986). However, since the leader self-development research is immature, future research should consider using a diverse leadership population (e.g., with respect to industry, experience, and education) and further investigate the applicability of cognitive ability.

By identifying the characteristics related to propensity to perform self-development, this offers the initial structure for an assessment tool that would provide Soldiers and their leaders with feedback in this important area. Exercises could potentially be developed to increase the motivation and skills needed to increase Soldiers' performance of self-development. Additional research is still needed, however, to ensure that all relevant characteristics have been included in the model and to replicate the findings with a more diverse population.

Supporting Performance of Leader Self-Development Activities

Results indicated that while the officers placed a high value on being a more effective leader, they were not as likely to believe that self-developing leadership skills would lead to becoming a more effective leader, and even less likely to believe that they could successfully develop a conduct a personal leadership self-development program. This suggests that additional information regarding how to conduct successful leader self-development could be useful.

The finding that nearly 50% of the officers reported performing leader self-development activities for 20 or more hours indicates that many officers are using this method of leader development to some extent. It is important to note, however, that this percentage could be inflated compared with the activities of the average Army officer due to the recent visibility of self-development for this group. These officers had recently received information about self-development during their professional development course and also received reminders to self-develop for several months prior to measuring their self-development activity. Officers who have not recently received these prompts would be likely to show lower levels of self-development activity. A field experiment would be required to test this. Also important, however, is the fact that a significant proportion of the officers in this research engaged in few or zero hours of self-development, even with the prompts to do so.

Results clearly showed that Soldiers differed in their propensity to engage in self-develop and that the relationship between propensity and performance of leader self-development was moderated by organizational support. As expected, individuals with very low propensity did not engage in leader self-development. For the others, having the organizational support program positively influenced officers with somewhat low or moderate levels of propensity.

Interestingly, however, the officers did not necessarily self-develop in areas that they reported as weak. It may be that self-development tools are more prevalent on some topics than others, so their self-development was dictated more by the tools they found than their diagnosed weaknesses. Nevertheless, providing organizational support to identify tools and strategies for self-development that are linked to specific performance areas appears important to ensure a link between areas needing improvement and self-development performance.

Unexpectedly, for individuals with high levels of propensity, results suggested that organizational support actually reduced performance of self-development activities. Leaders with moderate to high propensity performed self-development regardless of whether they received organizational support or not; however, high propensity individuals who did not receive information or access to the organizational support website spent more time or performed self-development activities than their peers who did receive the support.

One possible explanation for this unexpected finding is that the guidance and information provided on the website facilitated the performance of self-development activities for the high propensity individuals, helping those with high levels of motivation and skills perform self-development more efficiently and thus presenting the appearance of reduced performance. For example, individuals with high propensity are capable of performing self-development activities such as identifying learning

resources. Identifying suitable learning resources, however, could take considerable time. The website provided a variety of support information, including a matrix of activities organized by developmental goals and types of developmental resources, essentially reducing the time that would need to be spent performing self-development activities. In essence, these highly motivated and skilled individuals may have learned from the website how to streamline their self-development activities, thereby expending less time and effort in their self-development program than their skilled contemporaries who did not receive such information. Importantly, this explanation highlights a potential pitfall of measuring leader self-development performance by using the amount of time they spent on development activities. Future research should review how to operationalize self-development performance and consider developing measures that reflect the successfulness of the self-development activities.

Further, these findings emphasize the point that, while self-development is generally associated with positive performance outcomes, higher levels of self-development may not continue to produce equivalent increases in leader performance. Research has not yet determined the specific nature of the relationship between performing self-development and leader proficiency or effectiveness. Further research is needed to investigate this relationship.

When taken as a whole, these results have some useful implications for Soldier development. As mentioned previously, results suggest that assessment tools could be used to provide Soldiers with reliable information regarding their propensity to engage in leader self-development. Feedback could be semi-personalized based on whether the Soldier had very low, low to moderate, or very high propensity to self-develop. For Soldiers with very low propensity, strategies could be offered to help Soldiers circumvent or cope with their very low propensity. For example, these Soldiers might want to consider developing a plan and milestones for formal education opportunities. They could also be targeted to receive tools or exercises designed to attempt to increase their motivation and skills sufficiently to be able to benefit from self-development. For those with low to moderate levels of propensity, support tools, such as the website, could be provided that would assist Soldiers by providing information, strategies, and resources.

The issue of determining an appropriate level of organizational support for leader self-development is an important one for Army trainers and leaders. Although self-development is defined as a process in which the individual takes primary responsibility for identifying, planning, carrying out, and evaluating their own learning experience, this does not preclude the involvement of a supervisor or mentor. Army FM 7.0 *Training the Force* actually defines self-development as a planned process that involves the leader and the subordinate, promoting it as a shared responsibility. In order to enhance the effectiveness of self-development, Snow (2003) argues that officers should be required to develop an Individual Development Plan, and that more support should be provided to leaders in the form of multirater assessment and feedback tools as well as tools to support self-development efforts (e.g., resources and skill developing activities). Given the prominence of self-development in the leader development model, this level of organizational support may be warranted. Because organizational support had different effects for individuals with different levels of propensity, however, and because very little is known about the effects of organizational support, further research in this area is highly recommended.

Limitations and Future Research

This research has some limitations that should be noted. First, the results were based on a military sample of officers with similar demographic characteristics (e.g., age, experience, education) and as a result may be limited in generalizability. In addition, the leaders who participated in the research recently completed a formal professional development program. Future research should investigate these results in situations that are unrelated to formal training programs as well as over a greater length of time.

Another limitation involves common method bias. To some degree, item characteristic effects of social desirability and common scale formats and anchors may have influenced participants' responses. While every effort was made to emphasize participant confidentiality and the importance of honest responses, many of the items of these established scales were written in such a way away as to reflect socially desirable attitudes. In addition, most of the items were measured using a 7-point Likert scale with the same anchor points, which may result in artificial covariation. Method effects, however, were hopefully minimized by collecting predictor and criterion measures using different scale formats (7-point versus 5-point Likert scales and open-ended questions) at different times, at different locations, and over different mediums. In addition, subjects were asked to use diaries to log activities and information about time spent in self-development in order to minimize the negative effects of the parallel formats.

Regarding future research, we should emphasize that for the development of the initial model, we limited our variables to those with established relationships with motivation and performance in training. For future research, other attitude and personality variables that do not have clearly established relationships should be considered for their potential relevance. Possible candidates could include adaptability, flexibility, creativity, need for autonomy, need for independence, extraversion, hardiness, ambition, and initiative. In addition, work environment variables (e.g., supervisors, coworkers) or nonwork variables (e.g., friends, family) could also be examined. Additional conceptual work is also recommended for the measurement of self-development performance to avoid simply measuring success as the amount of time spent on development activities.

Further research is also recommended specifically for the Army to determine the optimal level of organizational involvement in the self-development process and how to account for differences in the support required based on propensity. Finally, further research should examine the impact of self-development performance on leader effectiveness as well as on other organizational outcomes such as retention, job satisfaction, and productivity.

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